

## ACUTE DIFFUSE GONORRHOEAL PERITONITIS.\*

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SINCE the discovery of the gonococcus by Neisser in 1879 and its isolation by Bumm in 1885, it has become known as one of the most important of the pathogenic bacteria. From Cushing I quote the following: "Few organisms, not even the bacillus typhosus, rival it in the number of suppurative sequelæ which may follow a primary infection. Its occurrence in the conjunctivæ, and in the iris, the bones,<sup>1</sup> the joints, bursæ and tendon sheaths, its occasional demonstration as the cause of endocarditis and pericarditis, pleuritis and phlebitis and the recent observations from the blood, show that its possibilities for metastatic complications are as numerous as are those arising from the spread of infection by direct continuity of surfaces."

In 1886 Saenger reported two cases of puerperal peritonitis which on account of the striking clinical evidence may be regarded as those of gonococcal origin. His cases cited were two multipara infected with gonorrhœa by their husbands—one nine and the other twenty-one days after delivery.

In the discussion which followed the report of the cases, in the absence of bacteriological proof Bumm was inclined to doubt the gonorrhœal cause of the peritoneal inflammation, and asserted that the gonococcus could live only in the superficial layers of mucous membrane. As a proof of his assertion he stated that he had many times attempted to produce suppuration by injecting subcutaneously cultures of gonococci, but had as yet failed in every instance to produce an abscess.

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<sup>1</sup> Cupler, R. C.: Gonorrhœal Osteomyelitis, *ANNALS OF SURGERY* January, 1907.

Kaltenbach was inclined to disagree with Bumm, and mentioned the formation of the urethral stricture as a reasonable proof that the gonococcus extended its exploits deeper than the mucous membrane.

During that year and the two following years, cases of peritonitis of gonorrhœal origin were reported by Loven, Hatfield, Huber, Penrose and Stevens. All these occurred in children infected with gonorrhœal vulvo-vaginitis, and are not conclusive owing to the lack of demonstrating the gonococcus in the peritoneal cavity.

More convincing, however, is the case reported by E. Ceppi,—that of a woman twenty-nine years of age, who had previously been healthy, with the exception of having had a vaginal discharge for one year. She was suddenly taken sick with chills, fever, abdominal tenderness and distention, and was vomiting bile. Laparotomy was performed, and several abscesses were opened. These and the cervical canal showed presence of the gonococcus.

In 1891, at the meeting of the German Gynecological Society in Bonn, Bumm emphasized his views more than ever and vehemently denied the possibility of the gonococcus existing in any other tissue excepting the mucous membrane.

At this same meeting, Wertheim presented his report of interesting, painstaking and conclusive experiments undertaken and conducted by himself, the results of which proved conclusively that the gonococcus alone, without the presence of other pyogenic bacteria, could produce suppuration in a serous cavity like the peritoneum.

He had injected gonococci with their culture media into the peritoneum of mice, rats, guinea pigs, rabbits and dogs, and produced purulent peritonitis which would reach its acme in about three days. All the animals experimented upon recovered, and he demonstrated the presence of the gonococci in the peritoneum, in the lymphatics and in the superficial muscular layers and their sheaths.

Wertheim noted that the peritonitis produced by the gonococcus was accompanied by an appreciable greater exudate than

that produced by other organisms, and concluded that in view of the susceptibility that the human being has for gonorrhœa, and in view of the results of his experiments on animals less susceptible to this infection, he had proven indubitably the possibility of its existence in the human being.

A few months later, he was able to further substantiate his conclusions by a female patient, age twenty-five, whom he was called to operate upon. The patient was a nullipara, and was suffering with pelvic pains and a leucorrhœa for three years. She was admitted for operation with symptoms of acute peritonitis. Laparotomy revealed pus discharging from the right tube. Cultures taken from peritoneal exudate showed gonococci.

The original assertions of Bumm were now proven as untenable.

Subsequently several cases are found to be reported in the literature of this subject. That gonorrhœal peritonitis can exist in the male is shown by cases reported by Challan, Mermet, McCosh, Van Zeisel, Horwitz, and Jadahsson.

In 1895, L. Frank published what might be considered the first case of gonococcal peritonitis, with bacteriological proof, as such published in this country. He had operated upon a prostitute seventeen years of age for acute pyosalpinx. During the operation the right tube had ruptured and soiled the peritoneum. In spite of the employment of irrigation and drainage, she developed a septic peritonitis within twenty-four hours, and died two days later. Cultures taken from the peritoneal cavity during the autopsy showed only gonococci.

Of the cases reported none are fortified by more convincing bacteriological proof than two cases reported by Harvey W. Cushing in 1899. He had operated upon two females, respectively twenty-five and eighteen years of age, at the Johns Hopkins Hospital, for peritonitis, and in the first obtained smears from the peritoneal exudate, showing gonococci, and from the second he also obtained gonococci in pure culture.

The writer should like to narrate here the report of a similar case operated upon by him in August, 1906:

R. J., age seven and a half years, school girl, was admitted to Beth Israel Hospital August 22, with history as follows:

Previous history negative.

*Present History.*—One week ago mother noticed that child was chafed about the genitals and that she had a vaginal discharge. The family physician, Dr. J. Rosenblueth, was consulted, and he, after instructing the mother how to prevent infection of the other children in the family, prescribed douches of a weak permanganate solution. Three days later the child suddenly became feverish and complained of being ill. Her temperature was  $102\frac{1}{2}$ , pulse 140. She complained of no pain, and there was no abdominal tenderness. An enema was administered and was followed by a movement. The douches were now discontinued. Twelve hours later vomiting set in. The temperature and pulse remained about the same, the tongue was coated, and she complained of pain in the epigastrium. There was absence of tenderness and rigidity.

Three doses of calomel,  $\frac{1}{8}$  grain each, were followed by vomiting. The following morning the child had several loose passages and had some pain in the left iliac region. Vomiting still persisting. The following, or the fourth day of illness, she felt better, and attempted to get up and about. At midnight vomiting set in again. Enemata were again administered but were not retained. The abdomen became distended and very hard. With increasing severity of the symptoms and the abdominal tenderness of the left side more marked, her condition became alarming and the following morning she was sent to the hospital. About this time it was noticed that the vaginal discharge had diminished.

*Examination upon Admission.*—General appearance is that of a very sick anæmic little girl. Temperature 100.6, respiration 34 and thoracic in character, pulse 130. Abdomen uniformly distended and tympanitic, but the rigidity of the recti was not marked. General abdominal tenderness more marked in umbilical and splenic regions. No tumor could be made out nor increase in tenderness in the right iliac region.

There was a clear picture of general peritonitis, and it did not appear to me as one of appendicitis nor intussusception. An examination of the vulva revealed a purulent discharge which was immediately examined and found to contain gonococci.

*Blood Examination.*—Leukocytosis, 12,800; polynuclear, 62 per cent.; (small mononuclear, 19 per cent.; large mononuclear, 2 per cent.); transitional, 1 per cent., and eosinophiles, 16 per cent.

*Diagnosis.*—General peritonitis, probably gonorrhoeal in origin.

*Operation.*—Ether, drop method on open Esmark inhaler. Abdomen opened through Kammerer incision  $2\frac{1}{4}$  inches in length over right rectus. Upon opening the peritoneal cavity some seropurulent fluid escaped. The intestines appeared very much distended and injected. The appendix was slightly injected, but otherwise appeared normal and not adherent. Several collections of purulent fluid were found between the intestines, one of which was located near the splenic region.

The pelvis contained a large abscess and the tubes felt thickened, but owing to the extreme distention of the intestines, could not be exposed. On several coils were deposits of lymph. Cultures and smears were taken by Dr. I. Strauss, pathologist of the hospital. Much of the fluid contents of the peritoneal cavity was mopped up with sterile dry sponges. The appendix was removed.

A small cigarette drain was inserted to the stump of the appendix, and another into the pelvis, and the remainder of the wound sutured. The bowels were moved at end of twenty-four hours, after which vomiting ceased. In addition to stimulation, she was given two injections of Torrey's anti-gonococcus serum, obtained through the kindness of Dr. Strauss. There was nothing noted after the injection of the serum which might have any bearing upon the course of the disease. The temperature was normal at end of the first week; all drainage was discontinued on the tenth day.

September 4, patient was discharged feeling perfectly well and the wound entirely healed. The vaginal discharge still showed the presence of gonococci four weeks after leaving the hospital.

*Bacteriological report* by Dr. I. Strauss, pathologist of the hospital: Patient, R. J., operated upon August 2, 1906. Spreads of vaginal discharge showed numerous pus cells, many intracellular Gram-negative diplococci or gonococci. Fibrin and exudate from peritoneum; numerous gonococci in masses of fibrin. No

pus cells; other bacteria absent. Cultures from peritoneum gave gonococci in pure culture on serum agar and serum sugar agar. Cultures from vaginal discharge contain gonococci. Appendix normal.

The case was therefore definitely an instance where the diffuse peritonitis was due to gonococcal infection alone, and a review of the literature of the subject (including 74 cases reported) present several points of interest for consideration.

*Etiology.*—Gonorrhœal peritonitis can exist in the male, but judging from the very few cases reported must be uncommon, and is caused by the infection extending along the lymphatics of the cord to the peritoneum. One such case with positive bacteriological findings at autopsy was reported by Challan in 1893.

In the female it may be a complication of an *acute* gonorrhœal vulvo-vaginitis, and, as pointed out and demonstrated by Veith, Cumston and others, gonorrhœa may be the sole cause of peritonitis arising during the second or third week of the puerperium. The infection is conveyed to the peritoneum either through the lymphatic system, or, as more commonly demonstrated by cases operated, the peritonitis is due to the emptying of the gonorrhœal pus direct into the general cavity through the patent ostium abdominale.

Gonorrhœal peritonitis may also be produced by direct infection during removal of an acute pyosalpinx, an instance of which is the case of Frank's, already narrated in this paper. That diffuse gonococcal peritonitis is not more common may be accounted for by the gummy or adhesive character of the exudate, which causes adhesions and confines the infection to the pelvic peritoneum or to the tube itself by sealing the fimbriated extremity.

With a view of ascertaining the dangers which might follow the rupture of a pyosalpinx, several investigators undertook to examine bacteriologically a number of tubes removed surgically.

Menge in 1891 reported results of his examination in 26

cases of purulent salpingitis and found bacteria in 8 of these, 3 of which contained gonococci. All three gonorrhœal tubes had ruptured during the operation, and their contents caused a soiling of the peritoneum. One of these patients died, and post-mortem one and one-half hours later showed streptococci in the peritoneal cavity.

Andrews, in 1904 (cited by Dudgeon and Sargent), published the results of bacteriological examination of the interior of the tube in 684 collected cases of pyosalpinx. The diagnosis in most instances was based upon microscropy only; some upon both films and cultures; and a few upon animal experiments. The result showed 55 per cent. to be sterile; 22.5 per cent. to contain the gonococcus, 6 per cent. saphrophytes only, and the rest a variety of pyogenic organisms. These figures, being based largely upon very incomplete bacteriological examinations, must be received with a good deal of reserve, but they go to show what a small proportion of cases of pyosalpinx constitute any grave danger to the peritoneum.

*Symptomatology.*—Several observers, notably Saenger, Charrier, Rousseau, Comby, Northrup and others, attempted to describe characteristic diagnostic features of diffuse gonorrhœal peritonitis, and the abrupt or explosive onset with very serious aspect is mentioned by Comby and Northrup as characteristic of this malady.

A careful perusal of the histories of the cases so far reported show that the symptoms do not differ materially from those elicited in peritonitis from other causes.

Ruptured appendicitis has in several instances been mistakenly diagnosticated. Nor is it always possible to differentiate clinically an acute pelvic from an acute diffuse peritonitis of gonorrhœal origin.

*Prognosis and treatment* have occasioned much discussion, owing to the view taken by some of the observers, particularly the French writers, who are inclined to take a very favorable view as to the outcome.

That gonorrhœal peritonitis is capable of producing a fatal septicæmia is proven by cases reported by Frank, Mejia

V. Leyden, Muscatello, Frank and Koehler, Lilienthal (quoted by Welt-Kakels), Koplik, and others.

Most writers agree that acute diffuse gonorrhœal peritonitis is particularly fatal in children.

In 1896 Broese reported 2 cases of vulvo-vaginitis complicated with symptoms of diffuse peritonitis, in which operation was deferred and both recovered. These and similar cases reported by Comby, Northrup, Sebilleau, Galvagno, Marfan, render the indications for operations questionable.

Most of these cases lack, however, the bacteriological proof of their gonorrhœal origin, and some lack the sufficient evidence that they were diffuse, but rather only pelvic peritonitis with severe symptoms.

Of the 75 cases collected, including the writer's case, only 30 had the diagnosis fortified by autopsy or bacteriological examination.

A detailed review of all the cases is precluded by the brevity of time allotted to me to the reading of the paper—a brief summary only will therefore be presented for your consideration.

Of these 30 cases, 14 resulted in death of the patient. There were 20 operated upon with a mortality of 4. Two of the deaths of the operated cases cannot be ascribed to the operation, nor alone to the gonorrhœal peritonitis.

One case by Hunner and Harris developed bronchopneumonia after operation, and at the autopsy, while the gonococcus was recovered in the peritoneal cavity, streptococci were found in the blood of the heart, in the lungs, bladder and other organs.

Second case is one of Dr. Koplik's, cited by Dr. Welt-Kakels, a child which had undergone two serious operations for empyema, developed a general peritonitis for which she was operated by Dr. Elsberg in the service of Dr. Lilienthal at Mt. Sinai Hospital. Cultures from the peritoneum proved the peritonitis to be of gonococcal origin.

The child was certainly not in a favorable condition, and therefore it is hardly fair to ascribe to the operation a contributory cause of her demise.



If we exclude these two cases, we have 18, with a mortality of 2—certainly a small one.

*Conclusion.*—Diffuse gonorrhoeal peritonitis is a serious and sometimes fatal malady, which, when not operated, is likely to leave a legacy of pus tubes in the female already doomed to sterility and possibly lasting invalidism.

Diffuse gonorrhoeal peritonitis may recover with palliative or symptomatic treatment alone, but we must continue to operate some of the cases with reasonable assurances of recovery.

The number of cases of gonorrhoeal peritonitis operated upon will be diminished when we will have the means of making a positive diagnosis as to the bacteriological character of the infection, or when a satisfactory antigonococcic serum will be at our disposal.

It is hoped, however, that the discussion occasioned by this report will enable us to bring to light some more clinical data which will help us to outline definitely the course to pursue in cases of suspected acute diffuse gonorrhoeal peritonitis.

*Conclusions:* The gonococcus is capable of producing a local or a diffuse peritonitis without the presence of other pyogenic bacteria.

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